

Patent Claims

1. A catadioptric projection objective for projecting a pattern arranged in the object plane of the projection objective into the image plane of the projection objective, having:
 - a first objective part for projecting an object field lying in the object plane into a first real intermediate image;
 - 10 a second objective part for generating a second real intermediate image with the radiation coming from the first objective part;
 - a third objective part for generating a third real intermediate image with the radiation coming from the
 - 15 second objective part; and
 - a fourth objective part for projecting the third real intermediate image into the image plane.
2. The projection objective as claimed in claim 1, wherein exactly three intermediate images are provided.
- 20 3. The projection objective as claimed in claim 1, wherein two of the objective parts are catadioptric respectively have a concave mirror.
4. The projection objective as claimed in claim 1, wherein the first objective part is refractive and the
- 25 second objective part and the third objective part are designed as catadioptric systems, each having a concave mirror, and a mirror surface is assigned to each of the concave mirrors in order either to deflect the radiation toward the concave mirror or to deflect the radiation
- 30 coming from the concave mirror in the direction of a subsequent objective part.
5. The projection objective as claimed in claim 1, wherein all intermediate images is arranged in the vicinity of a mirror surface.
- 35 6. The projection objective as claimed in claim 1, wherein all intermediate images are arranged at a distance from a mirror surface.

7. The projection objective as claimed in claim 1, wherein the maximum distance of an intermediate image from a mirror surface is less than 10% of the total length of the projection objective.

5 8. The projection objective as claimed in claim 1, wherein the first objective part is asymmetrically constructed.

9. The projection objective as claimed in claim 1, wherein the first objective part is essentially 10 constructed symmetrically with respect to a plane perpendicular to the optical axis.

10. The projection objective as claimed in claim 1, wherein the first objective part has at least two lenses with lens surfaces that have the same radius.

15 11. The projection objective as claimed in claim 1, wherein the second objective part and the third objective part are asymmetrically constructed, one of the objective parts being designed primarily for correcting the field curvature and the other objective 20 part being designed primarily for the chromatic correction.

12. The projection objective as claimed in claim 1, wherein the second objective part and the third objective part are essentially constructed symmetrically 25 with respect to one another.

13. The projection objective as claimed in claim 1, wherein a first catadioptric objective part has a first optical axis and a second catadioptric objective part has a second optical axis, and the first and second 30 optical axes are arranged coaxially.

14. The projection objective as claimed in claim 1, wherein a first catadioptric objective part has a first optical axis and a second catadioptric objective part has a second optical axis, and the first and second 35 optical axes are arranged offset with respect to one another.